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10/627,725

07/28/2003

Ho-Jin Kweon

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EXAMINER

CREPEAU, JONATHAN

ART UNIT

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1795

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/627,725	<b>Applicant(s)</b> KWEON ET AL.	
	<b>Examiner</b> Jonathan S. Crepeau	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 March 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 11-20,22-24 and 38-41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11-20,22-24 and 38-41 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3/12/08</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office action addresses claims 11-20, 22-24, and 38-41. The claims are newly rejected under 35 USC 103, as necessitated by amendment. Accordingly, this action is made final.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 22 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 22 recites the limitation "the mixer" in line 2. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 103***

4. Claims 11-20, 24, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 9-171813 in view of Gao et al (U.S. Pre-Grant Publication No. 2002/0127175).

JP '813 is directed to a rechargeable lithium battery comprising a lithiated positive electrode material. Regarding claim 12, the active material may comprise  $\text{LiCoO}_2$ ,  $\text{LiNiO}_2$ , or

$\text{Li}_x\text{Ni}_y\text{Co}_{1-y}\text{O}_2$  (see paragraph 24). The active material comprises a surface treatment layer on the lithiated core comprising a networked aluminum hydroxide/oxyhydroxide structure (see Figure 1). Regarding claim 18, in addition to aluminum, silicon or titanium may also be used (see paragraph 20). Regarding claims 11 and 39, the active material is made by a process of dissolving aluminum hydroxide in aqueous solution, coating the active material, and drying the coated compound at 120 degrees C for 2 hours (see [0036]). Regarding claim 13, an alcohol may also be used as a solvent (see [0022]).

The reference does not expressly teach that the drying is conducted at a temperature of approximately 60-100 degrees, as recited in claims 11 and 39.

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to manipulate the drying temperature of JP '813 so as to fall within the claimed range. It has been held that the discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980). In this case, the 120 degree temperature disclosed by the reference appears to be merely exemplary, and the artisan would be sufficiently skilled to reduce the drying temperature to affect the composition and crystal structure of the surface coating. As such, the claimed temperature range is not considered to distinguish over the reference.

Regarding claims 19 and 20, which recite the concentration of coating material source in the solution, paragraph [0036] of the reference appears to disclose a concentration of about 10 weight parts of aluminum hydroxide. Accordingly, this disclosure is sufficient to render obvious the claimed range of 0.1-50 wt% (5-30%) in aqueous or organic solution.

Regarding claims 14 and 16, which recite that the mixture is “refluxed” to form the solution of coating material source, this limitation is not considered to distinguish over the reference. It would have been obvious to employ any means necessary to achieve good mixing and dissolution of the coating source material into the solvent. Accordingly, the step of “refluxing” the material would have been well within the skill of the art to employ to make the coating material solution.

Regarding claim 24, the sieving of the dried compound would be an obvious step in preparing the compound for use in a battery electrode.

JP ‘813 does not expressly teach that the lithiated compound is prepared by mixing a lithium source, a metal source, and a solvent and heat treating the mixture twice, as recited in claims 11 and 39.

Gao et al. is directed to methods of making lithium cobalt oxides. In [0034], the reference teaches that source compounds can be suspended in a solution of other source compounds and the mixture is spray dried. Subsequently, the material is subjected to two heating steps to form the final cathode material (see [0035], [0036]).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to make the lithiated compound of JP ‘813 according to the process of Gao et al. In [0036], Gao et al. teach that the second heat treatment step forms and enhances the hexagonal layered crystal structure of the compounds. Further, the technique of mixing source compounds with a solvent and heat-treating twice was recognized as part of the ordinary capabilities of one skilled in the art, and therefore would have rendered the claimed subject matter obvious.

5. Claims 22, 23, 38, and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP '813 in view of Gao et al. as applied to claims 11-20, 24, and 39 above, and further in view of Maegawa et al (U.S. Patent 6,383,235).

Regarding claim 38, the drying step in JP '813 to evaporate the solvent can be characterized as “continuously increasing the temperature within the mixer.” However, the reference does not expressly teach that the lithiated compound and the solution are “injected” into the mixer as recited in the claim 38.

Maegawa et al is directed to a method of forming a cathode material by spray-drying. In the method, two solutions are mixed and then sprayed (injected) into a spray-dryer with a compressed air flow (see Example 1).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the spray-dryer of Maegawa et al. to perform the mixing and drying of the material of JP '813. Regarding the mixing of the materials of JP '813, it would be obvious to employ any method that would result in sufficient mixing of the lithiated compound and the coating solution. Maegawa et al. is evidence of this, and discloses in numerous locations that its process and apparatus provides for good mixing between the solutions. Therefore, a skilled artisan would be motivated to use a spray dryer as suggested by Maegawa et al. to mix the materials of JP '813. Furthermore, the use of a compressed air stream to introduce the solution as disclosed in Maegawa would render obvious the subject matter of claim 22.

Regarding the limitation in claim 40 that “the coating and drying of the lithiated compound is performed simultaneously,” it is submitted that the use of the spray-dryer of

Maegawa would also render this limitation obvious. As disclosed in Maegawa, spray-drying involves removal of the solvent as the materials are mixed. Thus, a coating and drying function are performed simultaneously.

Regarding the limitation that the coating step is performed under vacuum as recited in claim 23, this step would also be well within the skill of the art to perform in the method of JP '813 as modified by Gao and Maegawa. By performing an evacuating step in the spray-dryer, the net air flow through the spray-dryer would be increased and drying time would be reduced. Accordingly, this modification would be obvious to a skilled artisan.

6. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 9-171813 in view of Gao et al. as applied to claims 11-20, 24, and 39 above, and further in view of Shindo et al (U.S. Patent 6,045,947).

JP '813 does not expressly teach that the average particle diameter of the lithiated compound is 10 microns, as recited in claim 41.

Shindo et al. is directed to an electrode plate for a secondary battery. In Example 1 the reference discloses that an  $\text{LiCoO}_2$  material having an average particle diameter of 10 microns is used as the active material.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known

methods with no change in their respective functions and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention. In this case, the use of an  $\text{LiCoO}_2$  material having an average particle diameter of 10 microns as suggested by Shindo et al. in the electrode of JP '813 would have yielded predictable results and would have therefore been obvious.

### ***Double Patenting***

7. Claims 11-20, 24, and 39 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over the claims of U.S. Patent Nos. 6753111, 6797435, and 6846592 in view of Gao et al. Although the conflicting claims are not identical, they are not patentably distinct from each other because Gao renders obvious the two heat treatment steps as set forth in the above rejection.

8. Claims 22, 23, 38, and 40 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over the claims of U.S. Patent Nos. 6753111, 6797435, and 6846592 in view of Gao et al. as applied above and further in view of Maegawa et al. Although the conflicting claims are not identical, they are not patentably distinct from each other because Maegawa renders obvious the limitations of claims 22, 23, 38, and 40 as set forth in the above rejection.



9. Claim 41 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over the claims of U.S. Patent Nos. 6797435 and 6846592 in view of Gao et al. as applied above and further in view of Shindo et al. Although the conflicting claims are not identical, they are not patentably distinct from each other because Shindo renders obvious the claimed average diameter of 10 microns as set forth in the 35 USC 103 rejection above.

### ***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan, can be reached at (571) 272-1292. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Jonathan Crepeau/  
Primary Examiner, Art Unit 1795  
June 14, 2008